

WHAT IS CLAIMED IS:

1. An image forming apparatus that includes a
5 control part that provides common services on control
of hardware resources to a plurality of applications so
as to be able to include a plurality of applications,
the image forming apparatus comprising:
a virtual machine;
10 an application that is executed by the
virtual machine; and
an application management part managing the
application that is executed by the virtual machine.
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2. The image forming apparatus as claimed in
claim 1, wherein the application that is executed by
20 the virtual machine operates the image forming
apparatus by using classes for controlling the image
forming apparatus.

3. The image forming apparatus as claimed in
claim 2, wherein the classes include an operation panel
class for outputting information to an operation panel
5 of the image forming apparatus and for inputting
information from the operation panel.

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4. The image forming apparatus as claimed in
claim 1, wherein the application management part
includes execution management functions that include a
function for launching the application executed by the
15 virtual machine.

20 5. The image forming apparatus as claimed in
claim 1, wherein the application management part
downloads the application when the application is not
installed in the image forming apparatus.

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6. The image forming apparatus as claimed in
claim 1, wherein the application management part refers
5 to an application information file associated with the
application, and updates the application on the basis
of information in the application information file.

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7. The image forming apparatus as claimed in
claim 6, wherein the application management part
compares a first version described in the application
15 information file associated with the application with a
second version described in another application
information file associated with an update application,
and the application management part replaces the
application with the update application if the second
20 version is newer than the first version.

25 8. The image forming apparatus as claimed in

claim 5, wherein the application management part
downloads the application from a memory card or from a
Web site.

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9. The image forming apparatus as claimed in
claim 6, wherein the application management part
10 downloads the application from a location described in
the application information file associated with the
application.

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10. The image forming apparatus as claimed in
claim 6, wherein the application management part checks
whether the application is executable in the image
20 forming apparatus before downloading the application.

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11. The image forming apparatus as claimed in

claim 10, wherein the application management part checks whether the application is executable on the basis of information described in the application information file associated with the application.

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12. The image forming apparatus as claimed in claim 10, wherein the application management part checks items including a resource item in the image forming apparatus necessary for executing the application.

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13. The image forming apparatus as claimed in claim 1, wherein the image forming apparatus includes a server application that receives an operation request from a terminal apparatus connected to the image forming apparatus and that operates the image forming apparatus according to the operation request.

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14. The image forming apparatus as claimed in
claim 13, wherein the application management part
5 communicates with the terminal apparatus.

10 15. A terminal apparatus that operates an
image forming apparatus configured to be able to
include a plurality of applications, the terminal
apparatus comprising:
a virtual machine;
15 an application that is executed by the
virtual machine and that operates the image forming
apparatus; and
an application management part managing the
application that is executed by the virtual machine.

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16. The terminal apparatus as claimed in
25 claim 15, wherein the terminal apparatus is connected

to the image forming apparatus via a network, and the application that is executed by the virtual machine operates the image forming apparatus by using classes for controlling the image forming apparatus.

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17. The terminal apparatus as claimed in
10 claim 15, wherein the terminal apparatus operates the image forming apparatus by using a Java based distributed object processing technique.

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18. The terminal apparatus as claimed in
claim 16, wherein the classes include a function for displaying, on the terminal apparatus, an emulated
20 screen of a screen displayed on an operation panel of the image forming apparatus.

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19. The terminal apparatus as claimed in
claim 15, wherein the terminal apparatus has a function
for allowing a user to select whether to access a hard
disk of the image forming apparatus or to access a hard
5 disk of the terminal apparatus.

10 20. The terminal apparatus as claimed in
claim 15, wherein the application management part
includes execution management functions that include a
function for launching the application.

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21. The terminal apparatus as claimed in
claim 20, wherein the application management part
20 downloads the application when the application is not
installed in the terminal apparatus by communicating
with the image forming apparatus.

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22. The terminal apparatus as claimed in
claim 15, wherein the application management part
refers to an application information file associated
5 with the application, and updates the application on
the basis of information in the application information
file.

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23. The terminal apparatus as claimed in
claim 15, wherein the application management part
downloads the application from a memory card that is
15 inserted in the image forming apparatus or from a Web
site.

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24. The terminal apparatus as claimed in
claim 23, wherein the application management part
receives file information stored in the memory card and
displays the file information on the terminal apparatus.

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25. The terminal apparatus as claimed in
5 claim 23, wherein the application management part sends
URL information input into the terminal apparatus to
the image forming apparatus, so that the image forming
apparatus downloads the application from the Web site
by using the URL information.

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15 26. A method for operating an image forming
apparatus configured to be able to include a plurality
of applications by using an application that is
executed on a terminal apparatus connected to the image
forming apparatus via a network,

20 wherein the image forming apparatus includes
a virtual machine and a server application executed by
the virtual machine, and the terminal apparatus
includes a virtual machine and the application,

wherein the server application receives an
25 operation request sent by the application in the

terminal apparatus, so that the server application operates the image forming apparatus according to the operation request.

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27. The method as claimed in claim 26,
wherein the terminal apparatus operates the image
10 forming apparatus by using a Java based distributed
object processing technique.

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28. The method as claimed in claim 26,
wherein the image forming apparatus includes an
application management part for managing the
application, and the terminal apparatus includes a
20 remote application management part for managing the
application by communicating with the application
management part.

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29. A computer program executed in an image forming apparatus that includes a control part that provides common services on control of hardware
5 resources to a plurality of applications so as to be able to include a plurality of applications, the computer program comprising:

virtual machine program code means;

application management program code means
10 managing an application that is executed by the virtual machine program code means.

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30. The computer program as claimed in claim 29, wherein the computer program includes classes that is used by the application and that controls the image forming apparatus.

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31. The computer program as claimed in claim
25 30, wherein the classes includes an operation panel

class for outputting information to an operation panel
of the image forming machine and for inputting
information from the operation panel.

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32. The computer program as claimed in claim
29, wherein the application management program code
10 means includes execution management functions that
include a function for launching the application.

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33. The computer program as claimed in claim
32, wherein the application management program code
means downloads the application when the application is
not installed in the image forming apparatus.

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34. The computer program as claimed in claim
25 29, wherein the application management program code

means refers to an application information file associated with the application, and updates the application on the basis of information in the application information file.

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35. The computer program as claimed in claim
10 34, wherein the application management program code means compares a first version described in the application information file associated with the application with a second version described in another application information file associated with an update
15 application, and the application management program code means replaces the application with the update application if the second version is newer than the first version.

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36. The computer program as claimed in claim
25 34, wherein the application management program code

means downloads the application from a location described in the application information file associated with the application.

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37. The computer program as claimed in claim 34, wherein the application management program code means checks whether the application is executable in the image forming apparatus before downloading the application.

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38. The computer program as claimed in claim 37, wherein the application management program code means checks whether the application is executable on the basis of information described in the application information file associated with the application.

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39. The computer program as claimed in claim
37, wherein the application management program code
means checks items including a resource item in the
image forming apparatus necessary for executing the
5 application.

10 40. The computer program as claimed in claim
29, wherein the computer program further includes a
server application program that receives an operation
request from a terminal apparatus connected to the
image forming apparatus and that operates the image
15 forming apparatus according to the operation request.

20 41. A computer program executed in a terminal
apparatus that operates an image forming apparatus
configured to be able to include a plurality of
applications, the computer program comprising:
virtual machine program code means; and
25 application management program code means

managing an application that is executed by the virtual machine program code means.

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42. The computer program as claimed in claim 41, wherein the computer program includes classes that are used by the application and that control the image forming apparatus.

15 43. The computer program as claimed in claim 41, wherein the computer program causes the terminal apparatus to operate the image forming apparatus by using a Java based distributed object processing technique.

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44. The computer program as claimed in claim 25 42, wherein the classes include a function for

displaying, on the terminal apparatus, an emulated screen of a screen displayed on an operation panel of the image forming apparatus.

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45. The computer program as claimed in claim 41, wherein the application management program code means includes execution management functions that include a function for launching the application.

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46. The computer program as claimed in claim 45, wherein the application management program code means downloads the application when the application is not installed in the terminal apparatus by communicating with the image forming apparatus.

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25 47. The computer program as claimed in claim

41, wherein the application management program code
means refers to an application information file
associated with the application, and updates the
application on the basis of information in the
5 application information file.

10 48. A computer readable recording medium
storing a computer program executed in an image forming
apparatus that includes a control part that provides
common services on control of hardware resources to a
plurality of applications so as to be able to include a
15 plurality of applications, the computer program
comprising:

virtual machine program code means;
application management program code means
managing an application that is executed by the virtual
20 machine program code means.

25 49. The computer readable recording medium as

claimed in claim 48, wherein the computer program includes classes that is used by the application and that controls the image forming apparatus.

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50. The computer readable recording medium as claimed in claim 49, wherein the classes includes an operation panel class for outputting information to an operation panel of the image forming machine and for inputting information from the operation panel.

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51. The computer readable recording medium as claimed in claim 48, wherein the application management program code means includes execution management functions that include a function for launching the application.

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52. The computer readable recording medium as
claimed in claim 51, wherein the application management
program code means downloads the application when the
application is not installed in the image forming
5 apparatus.

10 53. The computer readable recording medium as
claimed in claim 48, wherein the application management
program code means refers to an application information
file associated with the application, and updates the
application on the basis of information in the
15 application information file.

20 54. The computer readable recording medium as
claimed in claim 53, wherein the application management
program code means compares a first version described
in the application information file associated with the
application with a second version described in another
25 application information file associated with an update

application, and the application management program code means replaces the application with the update application if the second version is newer than the first version.

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10 55. The computer readable recording medium as claimed in claim 53, wherein the application management program code means downloads the application from a location described in the application information file associated with the application.

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 56. The computer readable recording medium as
20 claimed in claim 53, wherein the application management program code means checks whether the application is executable in the image forming apparatus before downloading the application.

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57. The computer readable recording medium as
claimed in claim 56, wherein the application management
5 program code means checks whether the application is
executable on the basis of information described in the
application information file associated with the
application.

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58. The computer readable recording medium as
claimed in claim 56, wherein the application management
15 program code means checks items including a resource
item in the image forming apparatus necessary for
executing the application.

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59. The computer readable recording medium as
claimed in claim 48, wherein the computer program
further includes a server application program that
25 receives an operation request from a terminal apparatus

connected to the image forming apparatus and that operates the image forming apparatus according to the operation request.

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60. A computer readable recording medium storing a computer program executed in a terminal apparatus that operates an image forming apparatus configured to be able to include a plurality of applications, the computer program comprising:

virtual machine program code means; and

application management program code means

15 managing an application that is executed by the virtual machine program code means.

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61. The computer readable recording medium as claimed in claim 60, wherein the computer program includes classes that are used by the application and that control the image forming apparatus.

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62. The computer readable recording medium as
5 claimed in claim 60, wherein the computer program
causes the terminal apparatus to operate the image
forming apparatus by using a Java based distributed
object processing technique.

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63. The computer readable recording medium as
claimed in claim 61, wherein the classes include a
15 function for displaying, on the terminal apparatus, an
emulated screen of a screen displayed on an operation
panel of the image forming apparatus.

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64. The computer readable recording medium as
claimed in claim 60, wherein the application management
program code means includes execution management
25 functions that include a function for launching the

application.

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65. The computer readable recording medium as
claimed in claim 64, wherein the application management
program code means downloads the application when the
application is not installed in the terminal apparatus
10 by communicating with the image forming apparatus.

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66. The computer readable recording medium as
claimed in claim 60, wherein the application management
program code means refers to an application information
file associated with the application, and updates the
application on the basis of information in the
20 application information file.

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